

Undersea Defence Technology (UDT) La Spezia, Italy
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These reports summarize global activities of S&T Associate Directors of the Office of Naval Research International Field Offices (ONRIFO). The complete listing of newsletters and reports are available under the authors' by-line on the ONRIFO homepage: <http://www.onrifo.navy.mil> <http://www.ehis.navy.mil/onrnews.htm>; or by email to respective authors

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1. Keywords

Undersea defence technology, international conference & exhibition, military systems, technical presentations

2. Introduction

2.1. UDT is a large international exhibition and conference, which draws both military and technical staff from many nations. As such, it is a good venue for the warfighters to mingle with the technical staff from research organisations and marketing staff from major corporations. Many of the technical presentations, convened in three parallel conference rooms, were of a high academic standard (6.1) with significant levels of attendance by the delegates. Technical presentations from defence equipment companies

were comparatively free from overt commercialism. The final day of the conference was restricted to a classified session. Little new information was forthcoming from this session but interest was expressed in the advantages of the flat-nosed concept for the Blue Shark torpedo. It was considered that the work on multi-static sonar should be referred to Bill Roderick at SACLANTCEN.

2.2. Organisationally the conference had major shortfalls. These ranged from a lack of hotel room availability in the La Spezia region; inadequate car parking facilities at the conference center (particularly on the first day); inadequate air conditioning (in particular the apparent lack of appreciation that it is necessary to keep doors and windows shut for it to be effective); an inconsequential plenary session at which the Italian Minister of Defence (Political level), having arrived 30 minutes late, addressed the delegates in Italian with no translation facilities; poor projections of visual aids in the conference rooms; poor provision and limited time allocation for poster presentations (despite large areas of empty space); and totally inadequate cafeteria facilities. However, security was taken seriously and passes were checked frequently. Police in uniform were ever present both in and outside the conference center.

2.3. Technical sessions covered the following topics:

- Combat System Design
- Mine Warfare
- Unmanned Underwater Vehicles
- Navigation
- Ranges
- Environment
- Sonar & non-acoustic sensors
- Communications
- Operational Analysis for Undersea Warfare
- Weapons & Countermeasures
- Ship Design & Signature Management
- Training & Simulation

2.4. Arrangements were made for visits to the follow Italian ships and aircraft:

- Submarine - Sauro Class
- Frigate – Maestrale Class
- Minehunter – Gaeta Class
- Hydrographic Survey Ship
- Salvage Ship
- Helo- EH-101

3. Discussion

3.1. Naval Team Denmark (Captain Poul Groos): Following on from previous visits to Denmark, discussions were held with Captain Poul Groos (due to retire shortly) and their progress with STANDARD FLEX 3500 and 3000 platforms, which are being developed based on many years of experience with the well tried and proven STANDARD FLEX 300 platforms. These new frigate sized platforms (6,100t and 5,000t displacement) will retain the system flexibility and modularity of the earlier platforms, making use of roll-on/roll-off containers for systems' installation, or army vehicles including battle tanks etc, or mobile hospitals etc. The principle of containerisation will be paramount, taking advantage of shore side maintenance, leading to reduced manning and thereby emphasis on crew welfare and staff retention. The concepts developed and their operational experience by the Danish Navy may have benefits to the LSC and LCS(X) programmes.

Introductions were made to Lockheed Martin (E Carman) as Naval Team Denmark expressed interest in the Remote Minehunting System (RMS).

3.2. Orincon, San Diego: Discussions were held with Dan Sternlicht and his UK associates (Paul Willmott, Warrington Office, UK) following his presentation 'Detection and classification of buried objects with an adaptive acoustic mine-hunting system' (broad band 5-23 kHz, 2ms pulse with emphasis on classification by tone) in relation to the use of biomimetic signal classification algorithms. It was agreed that ONRIFO would set up a meeting when Dan Sternlicht next visited the UK. Concern was expressed on the reduction in target strength due to marine growth and reference made to fieldwork done by DREP, Canada in this context. NUWC agreed to place a mine on the seabed giving them the opportunity to make periodic measurements.

3.3. Ultra Electronics: Discussions were held with John Martin (Ultra Acoustic Systems, Greenford, UK) on their work with Johns Hopkins (related to LMRS and other submarine fit concepts) and their private venture (pv) work on deploying a high resolution sidescan sonar (tilted on two axes) as an ahead-look mine hunting sonar. It was agreed to set up a meeting at Greenford.

3.4. DSTL & QinetiQ: Extended discussions were held with DSTL (Richard Breward) and QinetiQ (John Wickenden and Giles Beatty) on the way ahead for US/UK collaboration. It was noted that QinetiQ had a significant stand at UDT, but seemed to be less well represented at S&T conferences. QinetiQ continue to collaborate with UCL (Trevor Sutton) and SACLANTCEN (Marc Pinto) on SAS but are increasingly conscious of protecting their IPR and reluctant to discuss their transducer motion algorithms.

DSTL, and UK military staff, had minimal representation at UDT.

It was suggested that John Wickenden (QinetiQ, Bingley) should visit NUWC for discussions on submarine communications (P Trask) and combat control (D McCormick) and the Norwegian MoD for discussions on sonar and towed arrays (Jarl Johnson) and submarine communications (Stig Lodoen).

3.5. Northrup Grumman: No technical information was available from staff (e.g.: Joe Davis) on SAS, though it is claimed that it has been proven to ranges of 400 yards.

3.6. BAE Systems: BAE Systems continues to dominate the Versatile Exercise Mine Systems (VEMS) market with their major market being the US. Different mine variants continue to be developed and the technology extended to deployable ranges etc. Archerfish (small fiber-optic controlled UUV) competes internationally as the next generation mine identification system. Discussions were held on the potential to adapt the system for ships' hull and berth inspection, particularly for ships visiting foreign ports.

3.7. NUWC, Keyport: NUWC demonstrated developments on a Tele-maintenance system (AN/PSM-99 Remote Technical Assistance Support System) based upon two-way video (with annotation) and voice transmission from a user to a command station (expert) based upon COTS hardware and software. The system is due to be used on a Fleet Battle Experiment in the near future and is readily adaptable for other uses (e.g.: tele-medicine, surveillance, crowd monitoring etc). Teaming with other organisations is welcomed and introductions were made with QinetiQ.

3.8. RADM Sharp, PEO MUW (Deputy: Mr. V Jimenez) plans to visit the UK in September and it was suggested that he should include a visit to ONRIFO.

3.9. Development of the Holland Submarine: A presentation was given by IBM on the history of the development of the series of Holland submarines. This was well researched and led into an explanation of the computer graphics techniques, which were used to understand the detailed engineering, in the absence of surviving plans and engineering drawings.

3.10. Conference Presentations: Conference presentations are due to be issued on CD but the following comments are considered to be relevant (ref: authors for further details):

5B1: "Classification of two and three dimensional targets from sonar data" – mostly based upon theoretical considerations from sidescan sonar data and the use of shadow (as has always been the case in France). The number of pings required to make a classification was not revealed, or any discussion on signal to noise ratios or false contact densities.

7B2: "Underwater acoustic link" – discussion on arming/de-arming/changing alert and active parameters of Manta mines in place in the water by acoustic links.

This presentation was followed up with interesting discussions with Bruno Faccini, the presenter, at the SEI-EPC booth.

9B2: “Contra-rotating propeller design” – optimising the weight/size/efficiency for torpedoes and emphasizing the need for a ‘test-to-build’ (as opposed to modeling) approach.

9B3: “Data fusion for automatic detection” (substitute paper) – theoretical discussions for torpedo waveforms for active search & classification in relation to low Doppler targets.

3.11 Ship visits: The visits were conducted at the Italian Navy Base in La Spezia. The ships looked good and had all recently been painted in anticipation of this visit but nothing unusual was observed.

4. Conclusion

4.1. UDT is worthy of support by a ‘limited’ number of ONR staff, though for this conference the organisation left much to be desired. As with all such meetings, which combine an exhibition and technical presentations (in parallel sessions), it is difficult to ensure that delegates gain best use of their time – and an uncongenial conference environment can only be detrimental. Technical presentations tended to be of a high standard and the proceeding on CD will be useful. The exhibition itself was biased towards operational systems and their marketing and less so to technical developments. For those interested in the latter, it nevertheless provided a venue to meet, exchange views, renew and develop collaborative relationships.

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